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Nathan Schumaker <[redacted]>

Latest HexSim Simulation

Anthony, Robert G - FW <robert.anthony@oregonstate.edu> **Fri, Jul 30, 2010 at 2:23 PM**
To: Nathan Schumaker <[redacted]>, Brendan White <Brendan_White@fws.gov>, Bruce Marcot <brucem@spiritone.com>, Brian Woodbridge <Brian_Woodbridge@fws.gov>, Jeffrey Dunk <Jeffrey.Dunk@humboldt.edu>, Dave LaPlante <dave@nrg-gis.com>, "katie.dugger@orst.edu" <katie.dugger@orst.edu>, Craig Ducey <Craig_Ducey@or.blm.gov>

Nathan:

Thanks for all of your hard work on the HexSim modeling. It looks like you have made some significant progress. My comments are in bold below.

bob

From: Nathan Schumaker [mailto:n[redacted]]
Sent: Thursday, July 29, 2010 2:33 PM
To: Brendan White; Bruce Marcot; Brian Woodbridge; Jeffrey Dunk; Dave LaPlante; Anthony, Robert G - FW; katie.dugger@orst.edu; Craig Ducey
Cc: [redacted]
Subject: Latest HexSim Simulation

Hi gang,

I've updated my HexSim baseline NSO scenario to incorporate feedback I got from several people.

Some of the changes include:

- The territory size is now 3 hexagons.
- I've changed the minimum quality for a hexagon to be used for a territory to 35. The minimum quality for a territory overall is now set to 3 x 35 = 105.

This looks reasonable to me.

- I am again stratifying resource targets by modeling region. This resulted from a conversation with Brian. However, I found it unrealistic to set the actual resource target based on the home range data that Dave put together -- those values were too large. I suspect this is because they reflect the total resource, whereas owls only consume a fraction of this total. So what I've done is to use the mean values to set the relative size of the resource

target. I set the resource target to 250 for birds in the Redwood Coast region, and then scaled up from there.

Again, this looks realistic to me.

- I have added the barred owl impacts on Survival.

Katie and I will be interested in how this affects the results or not.

- I have adjusted the dispersal stopping criteria to reflect the mean territory score (45.35) identified in Dave and Jeff's tables.
- I have raised the minimum score for repulsion to 30. This means that repulsion starts when a hexagon is scored 30, and I've set it to ramp up linearly to 90% at a hexagon of score 0.

I think this is a good approach.

- I've adjusted the home range size data to reflect the discussion between Brandan, Bob, and Brian.

I'm not convinced that we have it right yet, for the following reasons:

1. The overall population size may be a little high. I'm getting ~2000 female owls. This can be raised or lowered by shifting the resource targets up or down. See Baseline C PopSize.pdf.

I don't think a total population of ~2000 female owls is unrealistic. If anything, it might be a bit low

2. The population distribution through the landscape may be overly skewed to the south. This results from again stratifying the resource targets by region. The northern regions have much higher resource targets. What I did was to set the resource target for the Redwood Coast to 250. Then I scaled to other regions up based on the mean home range size. For example, the Redwood Coast mean home range size is 14 hexagons. The Washington Olympics mean home range size is 128. 250 x 128 / 14 = 2286, which is what I set the OLY resource target to. This may be the wrong scaling factor. See Baseline C DSA Trands.pdf and Baseline C Occupancy (100+).png.

A population that is skewed to the south reflects the current day distribution of the species for the most part, so this makes sense to me. I believe that the Redwood zone is pretty different from the other zones, so it might be better to set the resource target to that of another zone like the CA Klamath or OR Klamath.

3. The distribution of dispersal path lengths (stage 0 owls only) seems overly skewed to the right. I'm referring to the full path length in hexagons, not the ultimate displacement distance. The maximum allowed currently is 250 hexagons. See Baseline C Dispersal Path Length.pdf.

Based on analyses of real dispersal distances, you should expect a skewed distribution of dispersal distances, so this result appears to reflect data collected via telemetry techniques.

I'm also attaching a table showing the observed frequency of home range hexagon qualities. See Explored Area Quality (100-250).txt.

Sorry to heap so much on you all.

Some things to consider are:

A. The MaxEnt data may account for some of the latitudinal shift in hexagon quality (Jeff has said so). At the same time, a hexagon scored 90 on the Olympic Peninsula is not equivalent to a hexagon scored 90 on the Redwood Coast (according to Brian). So we probably need to scale my resource targets less dramatically.

B. The dispersal stopping criteria is being used to halt dispersal when a single territory quality hexagon (score of 45.35 or more) is encountered. I'm also drawing path length from a uniform distribution set to [0, 250] hexagons. Together, these seem to be causing very few medium and long distance dispersal events. I could raise the stopping value, raise the minimum path length, both, etc. Any feedback on what this distribution should be shaped like? Note that the histogram I sent used a log scale.

Hmm, I suspect that the distribution should approximate a negative exponential (right side of a normal distribution) but I am not 100% sure of this. So, a uniform distribution of dispersal distances may not be appropriate. You may have to change both the minimum path length and raise the stopping value to get at the appropriate distribution of dispersal distances.

That's it for the moment,

Thanks in advance for any feedback you might have.

Nathan
